

Math 322

Q's 13.5 #14 $f(n) = n-3$ if $n \geq 3$,
 $= 0$ if $n = 0, 1, 2$

$0 \rightarrow 0$
 $1 \rightarrow 0$
 $2 \rightarrow 0$
 $3 \rightarrow 0$
 $4 \rightarrow 1$
 $5 \rightarrow 2$
 $6 \rightarrow 3$
 \vdots

5-tuples

?

blank
 \rightarrow 3

	$1 \rightarrow 1$	
	$11 \rightarrow 1$	
tally	$111 \rightarrow 1$	tally
4	$1111 \rightarrow 1$	1
5	$11111 \rightarrow 11$	2
	$111111 \rightarrow 111$	
#	$11 \rightarrow 1111$	
	\vdots	

f: $\left\{ \begin{array}{lll} (S_0, I, S_1, B, R) & (S_1, B, S_F, I, R) & (S_{11}, B, S_F, I, R) \\ (S_1, I, S_{11}, B, R) & (S_{11}, B, S_F, I, R) & (S_{111}, I, S_F, I, R) \\ (S_4, I, S_{111}, B, R) & & \end{array} \right\}$

S_F
 $B \rightarrow B 111 \rightarrow 111$
 S

S_F
 $B P B \rightarrow 1$
 2
 2

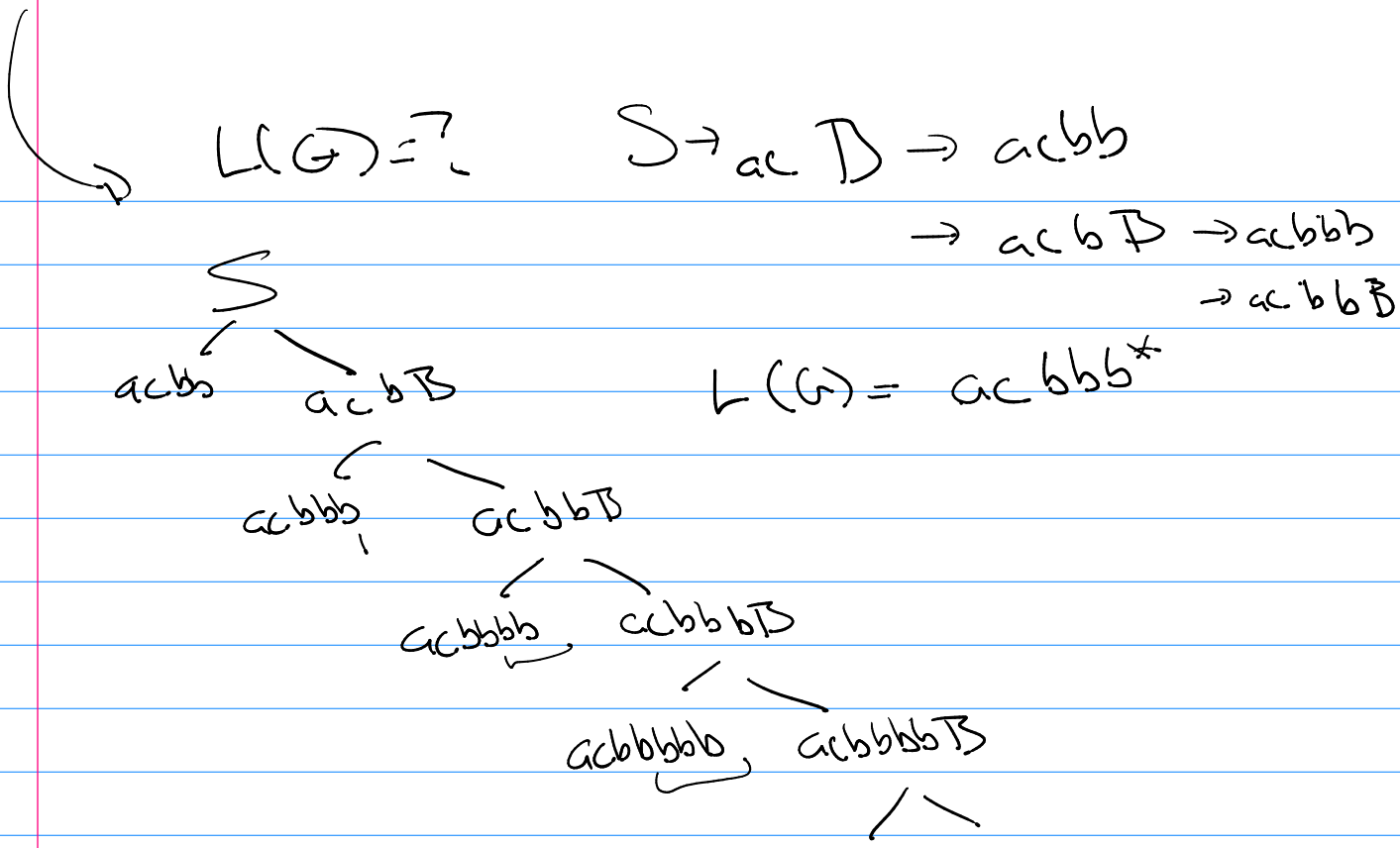
Exam 4

10 probs \rightarrow 20% = 100%
 @ 10 pts each

13.1 Languages (Grammars) (2 probs)

① using productions of a grammar.

$L(G)$ $\mathcal{P} = \{ S \rightarrow AB, A \rightarrow ac, B \rightarrow bB \}$
 is a given sentence valid? $B \rightarrow bb$



② Given productions \rightarrow name the grammar.

- a) type 0 not 1, phrase structure
- b) type 1 not 2, context sensitive
- c) type 2 not 3, context free
- d) type 3, regular

Ex B $S \rightarrow aA, A \rightarrow a, A \rightarrow \underline{Ac}$

type 2 not 3

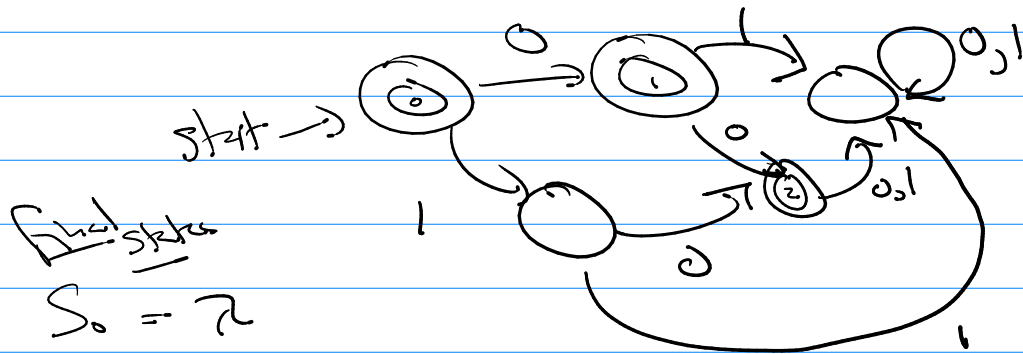
Ex C Finite State Machine with output (2 probs)

① } know: binary adder, 1-bit delay, 2-bit delay,
 ② } vending machine.

State diagram, State table

13.3 F.S.A (3 probs)

① given det. F.S.A, state $L(M)$



$L(M)$: $S_0 = \epsilon$

$S_1 = 0$

$S_2 = 00, 10$

$L(M) = \{ \epsilon, 0, 00, 10 \}$

② given a non-det FSA $\rightarrow L(M)$

③ given a non-det FSA use tech for proof of th^m 1 p. 874 to give det FSA with same language.



13.4 Language Recognition (2 probs)

① given language \rightarrow make F.S.A

ex $0 \cup 1^* \rightarrow M_{0 \cup 1^*}$: ?

② given productions of grammar \rightarrow make F.S.A.

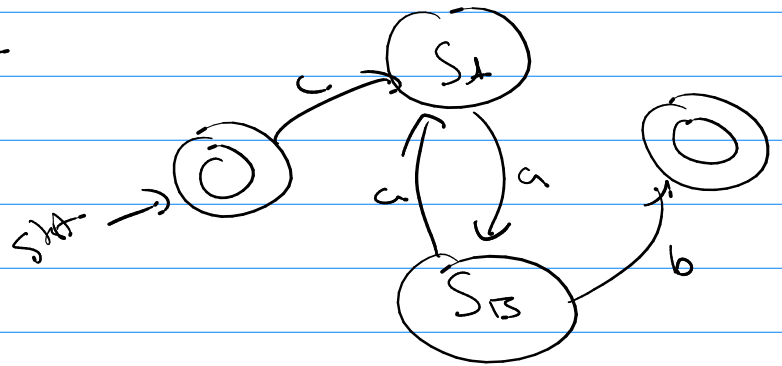
ex

$S \rightarrow cA, S \rightarrow \epsilon$

$A \rightarrow aB$

$B \rightarrow b$

$B \rightarrow aA$



$L(M) = \{ \epsilon, ca(aa)^*b \}$

13.5 Turing Machine 1 prob.

① Make and run Turing machine

